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ABSTRACT

This case study compared the performance of teaching assistants (TAs) who were native speakers and nonnative speakers (NNS) of English during office hour consultations with undergraduates. Three nonnative- and two native-speaking TAs in the economics department of a major American university were videotaped during office hour consultations. The nonnative-speaking TAs were from South America and had scored 200-220 on a language test, corresponding to overall intelligibility but with occasional problems in pronunciation, grammar, and fluency. The videotapes were then analyzed using the conversation analytical approach combined with a broader notion of context and trouble-shooting. The analyses suggested that even though the nonnative-speaking TAs had only an intermediate level of spoken English, language-related trouble in spoken English was rare, and was quickly and effectively resolved within a turn or two. Content-related trouble, however, was more common in the interactions of both nonnative- and native-speaking TAs in the interactions with undergraduates. An appendix provides transcripts of TA-student consultations. (Contains 56 references.) (MDM)

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ED 406 887

# Language- vs. content-related trouble in understanding: native and NNSTAs at office hours

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## Abstract

This case study examines trouble in understanding in native and nonnative TA-student interactions during office hour consultations. Instances of language- and content-related trouble in understanding are closely analyzed using a conversation analytical approach combined with a broader notion of context such as the one proposed by researchers in the field of ethnography of speaking. The analyses suggest that language-related trouble in understanding is rare--even though the NNSTAs have an intermediate level of spoken English, and is quickly and effectively resolved (usually within a turn or two). Content-related trouble, however, is rather common and sometimes takes whole problem-solving sequences to be resolved. A brief comparison between instances of native and nonnative language-related trouble in understanding is also provided.

**Language- vs. content-related trouble in understanding: native and NNSTAs at office hours**

This case study examines teaching assistant (TA)-student interactions during office-hour consultations. Its purpose is to better understand how TAs with a limited knowledge of English (nonnative speaking (NNS) TAs) manage to negotiate understanding with native students in one-to-one interactions. In particular, instances of breakdowns in communication are identified and analyzed, for that is one phenomenon within this teaching-learning activity where negotiation is often made more explicit.

The study, as well as many other recent ones about NNSTAs, finds its justification in the growing numbers of NNSTAs in US universities (Zikopoulos 1987), as well as in the protests of students and their parents about the poor language skills of NNSTAs. These protests have caused local authorities in nine states (Thomas and Monoson 1989) to pass legislation which requires all NNS graduates who want to become TAs to demonstrate a minimum level of linguistic competence in English prior to their TA appointments.

The most commonly used test to assess the oral skills of NNSTAs throughout the U.S. is the Test of Spoken English (TSE) or its retired version, the Speaking Proficiency English Assessment Kit (SPEAK) (Morgan 1989). This is the case at the university where this study has been conducted. Researchers, language instructors, and teacher trainers who work with NNSTAs do not believe the TSE/SPEAK alone is

appropriate to screen NNSTAs for at least three reasons. The first is because an adequate test of communicative oral proficiency should assess not only knowledge of the grammar, the phonology, and the lexicon of a language, but also of its discoursal and sociolinguistic norms, as well as adequate strategic competence (see Bachman 1990, Canale 1983, and Kramsch 1984, for discussion). The second is because there are more factors than language involved in the teaching effectiveness of NNSTAs: some of these are pedagogy, culture (understood in a broader sense than sociolinguistic norms), and affect, as has been shown in studies by Bailey (1984a); Fisher (1985); Brown (1988); Gillespie (1988); and Rubin and Smith (1989), among others. The final reason is because the TSE/SPEAK measures general oral proficiency skills which do not necessarily reflect the NNSTAs' oral language proficiency in the classroom, the physical sciences laboratory, or the office hour. This has been suggested by research on the influence of domain on the language proficiency of second language learners (Poulisse and Schils 1989, Tarone and Parrish 1988, and others), which indicates that second language learners' use of language may vary noticeably, depending on how well they know the subject matter they are talking about.

Considerations such as the ones mentioned above have led to a number of studies which focus on the language of the NNSTA in the work setting and on its relation to teaching effectiveness (Bailey 1984b, and Rounds 1987, in classroom settings; Myers and Plakans 1991, and Tanner 1991, in the physical sciences laboratory). Teacher-fronted settings, like classrooms, exhibit limited student participation. In a study on how

students signal non-communication, Darling (1989) reports the difficulty in obtaining data because students tend not to ask many questions in the classroom. Science labs, on the other hand, are more participatory than classrooms, but videotaping TA-student interactions is problematic due to the mobility of the TA and to safety considerations (Tanner, 1991). By contrast, the office hour--or an out-of-class session where students meet with their TA for individual consultation--is a most appropriate setting to observe and videotape interaction between TAs and students, a necessary condition in carrying out the present study.

At office hours, students have the opportunity to relate to their TA in a more personal way, to expand and clarify what has been presented in class, and to seek help with exams, homework, and term papers (McChesney 1990). As TA-training manuals reflect, the office hour is a teaching environment with characteristics of its own. In addition, Pica, Barnes and Finger (1990) state that "(w)orking with students on a one-to-one basis requires skills that are somewhat different from those needed for standing in front of a group of students and presenting new information" (65).

The need for detailed studies of native-nonnative interaction has been stressed frequently in the literature. After a number of studies in native-nonnative communication, Gass and Varonis (1991) still question "whether of not NNS discourse is qualitatively different from problematic discourse occurring between two NSs of a language. That is, are differences only a matter of degree or are they truly a matter of kind?" (14). More than a decade ago, Shaw (1983) also stressed this need, only

referring specifically to NNSTAs: "The nature of miscommunication between native speaking students and non-native TAs must be documented in much greater detail" (402). Similar remarks have been made by Chaudron (1988), Selinker and Douglas (1985), and Tarone and Parrish (1988), to mention a few. The present study is a response to such needs.

## Background

In this section, some definitions of negotiating understanding will be provided followed by a brief review of the relevant literature in three areas: Other NNSTA research, conversation analysis and the ethnography of speaking.

### Negotiating understanding: definitions

The process of negotiating understanding is all-pervasive in human interaction. Taken in its broadest sense it includes both displays of understanding that allow communication to continue, as well as displays of partial or total lack of understanding that allow communication to be "straightened out". The aspect of negotiating understanding that is of interest for this study, however, is that of trouble in understanding, generally referred to as problematic understanding.

In a study of communication and ways of achieving understanding in the context of second language acquisition, Bremer et al. (1988) research the area of problematic understanding, which they term *non-understanding* . Indications of *non-understanding* happen in a

continuum which ranges "from clear *lack of understanding* , explicitly indicated by the learner to *misunderstandings* between interlocutors, which only surface later or are never resolved" (52). Milroy (1984 ) and Gass and Varonis(1991) define misunderstanding in the same way. Indicators of partial or total lack of understanding may be requests for clarification or repetition, repairs, other audible and visible communication features, etc. Since understanding and non-understanding can only be recognized by the analyst through the respondent's treatment of the prior turn in talk (Schegloff 1984b), some NUs will not be identifiable, because the participants will choose not to make direct or indirect references to them. This is particularly true of misunderstandings for, when they occur, "there is an illusion of understanding between the speakers" (Bremer et al. 1988:52). Since the speakers are not immediately aware of a problem in understanding, a misunderstanding may or may not be dispelled later on in the encounter.

The concept of *lack of understanding* overlaps with Gass and Varonis' (1991) notion of *negotiated communication* , defined as "those exchanges in which participants in a conversation focus their attention on straightening out problems once they have occurred" (127)--'problems' refers here to problems in understanding. Another related concept is that of *incomplete understanding*, where "one or more participants perceive that something has gone wrong" (Milroy, 1984:15). Gass and Varonis (1991:130-1) classify incomplete understandings into three categories, according to source: linguistic (i.e., pronunciation, grammar, lexicon, etc.); pragmatic (i.e., the intended meaning or illocutionary force of an

utterance); and sociocultural (i.e., differences in meaning related to different social and cultural backgrounds of the speakers). In the present study, the notions of *negotiated communication* (Gass and Varonis,1991) and of *non-understanding* (Bremer et al. 1988) will be expanded to include not only linguistic, pragmatic, and sociocultural factors, but also academic content, the overall label used to encompass these phenomena being *trouble in understanding*.

The label *trouble in understanding* is meant to include at least two types of problematic understanding that have been distinguished by Rulon and McCreary (1986): one where meaning is negotiated and another where content is. Rulon and McCreary define the latter as the "process of spoken interaction, whereby the content of a previously encountered passage (aural or written) is clarified to the satisfaction of both parties" (182). By contrast, in the negotiation of meaning, it is an unclear or misunderstood word or phrase that gets clarified. While being conceptually valuable, this distinction may become blurred in a teaching/learning activity such as an office hour consultation, particularly when one of the participants in this activity is a NNSTA. Since speakers do not always show lack of understanding (whether because they choose not to or because they are not aware of it, as pointed out above), a partially understood and unclarified word or phrase, for example, may lead to partially understood content, at which point, negotiation of content might begin. Poorly understood content might, in turn, contribute to the incomplete understanding of particular words or phrases, since the

listener must rely mainly on pronunciation and structure and less so on context or background knowledge.

**Other NNSTA research**

The literature on NNSTA issues is extensive, including studies in areas as varied as the students' attitudes and perceptions of NNSTAs, NNSTA discourse, teacher training, and oral proficiency assessment issues. Having already addressed the issue of oral proficiency assessment in the previous section, I shall now focus on the areas of attitude and discourse, which are probably the main contributors to what Bailey (1984a) labelled "the foreign TA problem". (For a comprehensive review of the teacher-training literature, see the 1989 special issue of the English for Specific Purposes journal on the training of international teaching assistants.) In spite of the ethnic diversity of many U.S. campuses, American undergraduates are not necessarily the most tolerant of students when it comes to evaluating NNSTAs. It is true that inadequate TA selection procedures and lack of appropriate TA training have allowed some linguistically and pedagogically unskilled NNSTAs to serve as instructors. Yet a number of studies have shown that, even when this is not the case, the attitudes of undergraduates towards NNS (i.e., foreign) TAs tend to be more negative than those towards native (US) TAs. Such were the findings of Brown (1988), who investigated the attitudes of undergraduate students toward TAs and found significant differences depending on what ethnicity, status, or native language the TA had been assigned. Rubin and Smith (1989) also found that accent, ethnicity, and

lecture topic have a significant effect on undergraduates' perceptions of TAs. Similarly, when comparing students' perceptions of the speech of NNSTAs with the NNSTAs' oral proficiency, Orth (1982) concluded that the students' negative evaluations of NNSTAs' speech are frequently based on social mythology rather than on linguistic reality. Some studies relating the attitudes of main-stream native speakers of English towards minority groups based on accent yielded results similar to Orth's (Hopper, Hewett, Smith, and Watkins 1972, Baird 1969, and Browning, 1982). Other studies of students' attitudes involving NNSTAs are: Hinofotis and Bailey (1981), Parret (1985), and Shirvani (1987), but they either do not attempt to distinguish between native and nonnative TAs, or they do not find any relevant differences between them.

The second area of NNSTA research to be addressed here, discourse, has been recently reviewed by Tanner (1991). Some studies in the NNSTA discourse tradition include: Bailey (1982); Shaw (1983); Katchen (1984); Rounds (1985,1987); Gillespie (1988); Tyler (1988); and Williams (1992). These studies have been able to draw profiles of successful NNSTA behavior in the classroom or in the laboratory, based, for example, on overall teaching styles (Bailey 1984b), on particular kinds of questions asked by the TAs (Tanner 1991), or on existing relations between prosody, syntactic structure, lexical discourse markers, and rhetorical patterning (Tyler 1988).

**Conversation analysis**

Human communication is an area of study which has been approached from many perspectives: philosophical, linguistic, social, anthropological, psychological, technological, etc.. In recent years, however, certain aspects of communication have taken center stage. Of particular relevance to the present study are the fields of conversation analysis and ethnography. Conversation analysis (CA), which originated from the combined efforts of H. Sacks, E. Schegloff, and G. Jefferson in the 1960's, "seeks to describe the underlying indigenous social organization--conceived as an institutionalized substratum of interactional rules, procedures, and conventions--through which orderly and intelligible social interaction is made possible" (Goodwin and Heritage, 1990: 283). In other words, CA attempts to find out and document how talk-in-interaction is organized in ordinary conversation, a process that takes place by analyzing interaction from the participants' perspective. But let us first review some of the basic notions and analytical units that constitute the basis of CA as a discipline. I shall not attempt to summarize the whole theoretical underpinnings of CA here (see Heritage 1984, for a more extensive review), but I shall try to briefly introduce those concepts of CA which are most applicable to the present study.

Three basic theoretical assumptions of CA are that: "(1) interaction is structurally organized; (2) contributions to interaction are contextually oriented; and (3)...no order of detail can be dismissed, *a priori*, as disorderly, accidental, or irrelevant." (ibid. 1984: 241). Related to these is the assumption that interaction is context-oriented in two fundamental ways: a speaker's communicative action shapes the context in which it

occurs and is, at the same time, shaped by it (context in CA terms being generally the preceding and following interactive actions). The concept of *sequential implicativeness* (Schegloff and Sacks 1973: 296) follows from those assumptions. An illustration of this concept is the notion of *adjacency pair*, "whose central characteristic is the rule that a current action (a 'first pair part' such as a greeting or a question) requires the production of a reciprocal action (or 'second pair part') at the first possible opportunity after the completion of the first." (Goodwin and Heritage 1990: 287). The adjacency pair rule not only explains how interaction is organized, it also provides a resource for the analyst to observe how a hearer interprets a speaker's previous utterance (whether hearer does or does not understand speaker, and whether or not s/he sees the need and chooses to initiate 'repair' on speaker's utterance).

*Repair* is another basic concept in CA with strong analytical applications. Schegloff (1987a) defines it as: "efforts to deal with trouble in speaking, hearing or understanding talk in interaction" (210). The gamut of troubles included in this definition ranges from misunderstandings to word searches and from failure to hear to incorrect understanding by the hearer. The concept of trouble in understanding proposed in this study goes beyond the notion of repair as defined above, to include instances where understanding academic content may be at stake. Some analytically relevant elements of the repair sequence, in addition to who actually does the repair, are the *trouble source*, or where the problem originates, and the person who initiates the repair--be it the one whose utterance contains the problem ('self'), or a different one

('other'). Combining the two possible repair initiators and the two possible repair correctors, four categories of repair emerge: 1) self-initiated self-repair; 2) other-initiated self-repair; 3) self-initiated other-repair; and 4) other-initiated other-repair (see Schegloff, Jefferson, and Sacks 1977, for examples). Because of the wide range of environments in which repair may occur, some types of repair are more likely to be relevant to the analysis of negotiated understanding than others. Next-turn repair initiators (NTRIs) are one such type (ibid. 1977 and Schegloff 1979), since they provide the first opportunity for the next speaker to initiate repair on a previous speaker's turn.

Other phenomena which will bear on the analysis of the TA-student interaction in the office hour are: silences, overlaps, and body movements. The first two phenomena are directly related to another fundamental assumption of CA: that, in ordinary conversation, only one person speaks at a time (also the basis for the turn-taking system of conversation--see Sacks, Schegloff, and Jefferson 1974, for further explanation). The relevance of silences stems from the fact that they may be interpreted differently depending on: 1) where in the sequence of talk they occur (for example, whether in the middle or at the end of a turn, at a point of possible completion, etc.); 2) their length; and 3) who they are attributed to (i.e., who the participants themselves attribute the silence to, which will then define it as an actual silence, a gap, a pause, etc. (Schegloff, 1991)). Overlaps (i.e., two or more speakers talking at the same time) are subject to similar considerations like the ones made for silences above. Interrupting a speaker's turn, prolonging an overlap,

raising pitch and volume while overlapping--i.e., showing "competitiveness" (Schegloff, 1987a: 207), and so on, all have interpretive value in CA terms.

Finally, body movement (eye gaze, hand and head gestures, body posture and orientation, etc.), is also relevant for the study of interaction, as has been documented by Goodwin (1981), Heath (1986) and Moerman (1990), among others. Moerman, however, remarks on the inadequacy of the distinction between the terms *verbal* and *non-verbal* when referring to human communication and proposes instead the terms *audible* and *visible* to refer to that which can be heard and that which can be seen, respectively (9).

## CA and the ethnography of speaking

In CA, context is bound by the preceding and subsequent turns of the particular interaction under study, while sociocultural considerations such as socioeconomic status or gender (for example) are only taken into consideration when the speakers themselves explicitly refer to them in their talk. It follows from this that the units of analysis in CA are turn-constructional units, turns, and sequences of turns (cf. Schegloff,Jefferson, and Sacks 1977, for definitions).

The ethnography of speaking differs from CA in that it uses the *speech event* as its analytical unit (Hymes, 1972). The ethnography of speaking takes "the range of actual or potential speakers, the spatio-temporal dimensions of the interaction, (and) the participants' goals"

(Duranti, 1988:216) into consideration, while its purpose is to understand the relations between everyday talk and the social activities in which it happens. Both CA and the ethnography of speaking analyze interaction from the participant's perspective, while sharing the belief that speech creates context. For these and other reasons that he details in his conclusion, Duranti (1988) suggests that the cooperation which already exists between the two disciplines should be enhanced, since, together, CA and the ethnography of speaking will "help clarify the mechanisms and meaning of daily verbal interaction." (224). In referring to this symbiotic relationship which exists between ethnography and CA, Moerman also states: "Ethnography begins--and conversation analysis does not end--with finding abstract rules and regularities. Its goal lies in discovering how those rules and principles are invoked, made relevant, enforced, and disputed in the rough and tumble, the felt and fought over, course of everyday life." (21)

The present study reflects the cooperation between CA and the ethnography of speaking, insofar as the negotiation of understanding is an interactive process that is constructed turn by turn, but is also embedded in a concrete situation, where participants play specific roles and aim at particular goals. In the office hour setting, the TA and the undergraduate student play certain roles and have goals and expectations which will necessarily affect their interaction. While characterizing and describing instances of negotiated understanding, this study will attend to the display of such contextual features in the process of negotiation.

## Methods

Three Economics NNSTAs from South America[1] and two NSTAs, all male (there were no female Spanish-speaking TAs in the department), were videotaped during office hour consultations at a major US university. The NNSTAs had scored between 200-220 in the SPEAK test (corresponding to 'overall intelligible, but with occasional problems in pronunciation, grammar and fluency'). A total of forty TA-student interactions (also referred to as 'sessions' here) were videotaped for a total time of fifteen hours. Every TA was videotaped for at least one hour and up to four.

The videos were first viewed by the researcher in order to identify trouble in understanding within the problem-solving sequence of every consultation. This was achieved by looking for manifestations of trouble in the interactions as indicated by critical audible and visible behavior, and by determining whether or not understanding might have been the trouble source in each particular instance (rather than, for example, difference of opinion). All the instances of trouble in understanding identified were transcribed following Jefferson's transcription coventions published in Atkinson and Heritage (1984: ix-xvi), with slight additions (see Appendix 1). A turn-by-turn analysis of segments containing evidence of trouble in understanding was then performed, making use of the conversation analytical concepts introduced above (Schegloff et al.,

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[1]Given the case-study nature of the project, it was deemed important that the NNSTAs all had the same language background and a similar level of spoken English.

1974, 1977; Goodwin, 1984; Duranti, 1988; Moerman, 1990; and others). The following questions were asked about each case identified:

1) What is the source of trouble in understanding? (i.e., where the need to negotiate understanding arises from: whether from content or linguistic factors).

2) How are instances of trouble in understanding handled interactionally?

3) What is the outcome of each instance of trouble in understanding? (i.e., whether or not it results in understanding).

In addition, a comparison between instances of trouble in understanding involving native and NNSTAs is made whenever possible.

The next two sections contain examples and analyses of language- and content-related trouble in understanding. The language examples are brief, therefore they can be illustrated within a single segment. The content examples, however, sometimes extend over several pages of transcripts, consequently, only the segments containing evidence of trouble are shown, providing a summary of or referring the reader to other parts of a problem-solving sequence by session, page, and line numbers (Appendix 2 contains full transcriptions of the sequences analyzed)[2].

## Language-related trouble in understanding

[2]The lines and page numbers in the trancripts have been left as in the original full transcripts for future reference, were the reader ineterested in ordering them from the researcher for further viewing and analysis.

This section presents three out of the thirteen instances where language appears to be the main source of trouble in understanding, the first two involving a NNSTA and the third one a native TA. (Note: in the transcribed texts, 'L' stands for 'line', 'S' for 'student', and 'TA' for 'teaching assistant'. Also, the symbol "--->" normally points at a turn that indicates trouble or up-coming trouble here.)

**Language: NNSTA cases**

Case one, illustrated in segment 1 below, takes place towards the beginning of a consultation. The problem solving sequence started with the student posing her[3] question and now continues with the TA providing an explanation.

(Segment 1. Session 26, pp.3 and 4)

```
    TA: So what is the mmmaximun amount of money you're gonna spend
        (in school.)                                    ((Looking at S))
        (1.0)
    S:  One million.                                ((S points at notes))
50  TA: So (.5) this (u)stuff in here.
        (1.0)
--->S:  I'm sorry?                    ((S looks over TA's notes, confused))
    TA: This (u)stuff. the New budget constraint (stuff) from here.
        (.2)
-------------------------
1   S:  Well this is schoo:ls.                                  page 4
    TA: yeah but so that's what I am telling you.
        (.3)
```

[3]Since all the TAs in the study are male, they are referred to in the masculine form. Also, since most students are female, they are referred to in the femenine form when addressed in general and by their gender when individually.

In line 49, the student exhibits understanding of the preceding TA turn (LL.46-7), and this is confirmed by the next turn by the TA (L.50). However, the repair in line 52 indicates that the student has trouble in understanding the previous turn. The trouble here seems to stem from the word "(u)stuff" (p.3, L.50), as the TA himself makes clear by repeating it and clarifying its referent (p.3, L.54). There are two interpretations for what the trouble source may be in this context: 1) pronunciation--lack of understanding of the word "(u)stuff" because the TA added a vowel sound to it; and 2) reference--not knowing what "(u)stuff" refers to. The TA's response to the student's trouble addresses both possible sources of trouble in understanding, the first one by repeating the word and the second one by providing a specific referent for it. The clarification is effective, as evidenced by the student's response (p.4, L.1), and the problem-solving process continues.

Segment two below, illustrates case two of the NNSTA language examples. The interaction that follows takes place about one minute after segment 1.

(Segment 2. Session 26, p.5)

```
        Up to six hundred (.) what do you have.          ((TA looks at S))
        (1.0)
--->S:  Up to six hundred or you mean above six hundred
5   TA: Up to six hundred. what do you have.
    S:  It's gonna cha:nge.
        (.7)
```

This segment begins with a probing question by the TA (L.4--the TA knows the answer to this question), who is continuing the explanation process after a series of disagreements about the solution to the

economics problem being dealt with. Here, the student makes it explicit that she has heard the TA clearly, but her request for clarification questions his word choice and provides two alternative interpretations (L.4). By repeating the trouble utterance and restating the question (p.5, L.5), the TA claims, implicitly, to clarify the matter. The clarification is efficient, as evidenced by the student's response (L.6), and the problem-solving process is restored.

In addition to language, content may also be interfering with understanding in this case. The student's turn in line 4 makes one of the following claims: 1) the student is requesting clarification, implying either that she is conceptually confused or that the TA is; or 2) the student is requesting correction, implying the TA made the wrong linguistic choice--this second option may be reinforced by the fact that the TA is nonnative and, therefore, prone to making language mistakes. However, there is not enough analytical evidence to determine whether language, content, or a combination thereof is affecting trouble in understanding in this example.

**Language: Native speaking TA case**

The segment that follows contains the only language-related instance of trouble in understanding involving a native TA in the office hour consultation data. It takes place in the middle of a problem-solving sequence.

(Segment 3. Session 35)

((TA and S are sitting side by side. TA is pointing at notes with pen for most of the segment))

1 TA: Okay. do you understand why this is a bundle of goods

(.5)

--->S: Wait.<do I understand why it's what?

TA: Why this point A represents a bundle of goods?

5 S: No.

TA: 'Kay.<'cause you get this much Y:, and this much Xss.

S: Okay.

Here the student produces an next turn repair iniciator (NTRI) (L.3) that locates trouble in the second half of the TA's preceding utterance: "a bundle of goods" (L.1). The TA's reply (L.4) is designed to clarify two possible troubles, one of hearing (thus the repetition of the sentence), and one of understanding a reference (thus the recasting of "this" as "this point A", and "is" as "represents"). The repair is effective (the student then answers the question (L.5)), and the explanation continues (L.6). Whether it be a hearing or an understanding problem, language, and not content, appears to be the trouble source in this instance.

The native and nonnative TA examples analyzed in this section share two characteristics: 1) in them, language is the most likely, if not the only source of trouble; and 2) they are instances of trouble in hearing or understanding in which the flow of the interaction (here the problem-solving sequence) is disrupted momentarily. When this trouble is resolved--usually within the next turn or two--interaction is resumed where it had been left. Further comments are provided in the last section of the paper.

### Content-related trouble in understanding

In this section, two cases of trouble in understanding are analyzed, one from a NNSTA's consultation and the other from a native TA's. The two problem-solving sequences that follow have been selected because

they each exhibit at least one instance of content-related trouble in understanding. As with the cases previously analyzed, the trouble source/s, trouble handling, and outcome of each instance of trouble in understanding are addressed. Also, as explained above, only selected segments of each sequence are shown, making references to and summarising other turns or segments of interest by page and line numbers.

**Content: NNSTA case**

The problem-solving sequence selected for analysis comes from session 13 and is the first item in the student's agenda (see Appendix 2 for full transcription). The student requests help about a test question she "has never figured out how to do:." (p.1, L.15). After providing some background about her attempt to solve the problem by herself (p.1, LL.28-34), the student poses her concern in a statement form: "I can't find the total rate of inflation or the average annual rate of inflation." (p.1, LL34-35). The TA begins an explanation (p.1, LL.36-45) that eventually elicits a change of state token by the student: "O:h. ok[ay" (p.1, L.48) and, by implication, a sign of understanding. The fact that the TA corrects himself in the next turn because he had made a calculation error (p.1, L.50), provides valuable information to re-interpret the student's change of state token in the preceding turn, indicating possible trouble in understanding. The TA finishes his calculation (p.3, LL.1, 6, and 8) while the student repeats parts of it aloud as she takes notes (p.3, LL.2, 4, and 7). The student then expresses having learned something she did not

know (p.3, L.9) and proceeds to explain her previous error to the TA in response to the TA's remarks (p.3, LL.11-19). The interaction that follows (segment 4 below) contains evidence of trouble in understanding.

(Segment 4. Session 13, pp. 2 and beginning of 3)

```
20  TA: ntch .hhh and the average inflation the average annual rate
        of inflation isss (.2)*.hhhh uh (.)          ((*Reaches out for pen))
        you remember iss a (.7)
        (*°            pen)        ((*TA's pen doesn't work. S gives him one))
        Is o:ne pluss (.2) the average is going to be-
25      equal to: (.) what the number of year. right?
--->    (1.0)
        one ove:r (.3) N. N is the *number of (     ). right?       ((*TA taps
        So we have here [that this multiplication          /with pen. S nods))
    S:                  [(     )
30  TA: Is iss u::::h two hundred five. right?                  ((TA stops writing,
        (1.0)                                                        /looks at S))
--->S:  Wha::t?
        (1.0)
    TA: This is the total inflation.          ((Shows notes to S and points))
35      (.7)
--->S:  Okay but why did you put out those little parentheses here. ((Points
    TA: .Hh because if you want if you ha:ve (.) for example we have      /at
        he::re o::ne nineteenn seventy-five, nineteen seventy-six    /notes))
        (.5)
40  S2: [(      )                    ((S2--off screen, giving something to TA))
    TA: [Ni:netee:nnnnn eighty-ni- *yeah. thank you.(.)              ((*To S2))
        and nineteen (.3) ninety, (.3) okay?           ((Writing all along))
    S:  Uhu,
    TA: And I have the inflation from here to he:re, (.5) well
45->    uh this with respect to thiss right? (.)        ((No uptake by S))
        this the the the:: (     ) years from respect to thi:s
    S:  Okay:,
```

```
        (.)
    TA: Oka:y? (.) so I have a (annual) inflation with respect
50->    to last year (.5) right? .hh so:, (.3) to calculate the  ((No uptake
        total inflation y'have to multiply thiss.                      /by S))
        (.)
    S:  Just the[: the difference inn [uhm
    TA:         [(   )               [Yeah one plus B (.) of a:::::
-----------------------------
1   TA: [seventy-fi::ve, .h [one plus (.) u:::::hm (     )          R.13, p.3
--->S:  [One (     )         [(o:h.)
    TA: Seventy:::::::::-seven,and so on.*                  ((*TA stops writing))
    S:  Okay.
5   TA: Okay? .hhh so *this is the SA::me as calculate the the   ((*Writes))
        inflation rate of ni::nety-ninety with respect to ninety:
        sseventy-five.
    S:  O:kay.
    TA: Which in this case is two hundred five. right?
10->    (1.0)                    ((S nods. TA looks at her, then S answers))
    S:  Okay.
```

At the end of a long turn (p.2, LL. 20-25) which is briefly interrupted by an aside (p.2, L.23), the TA produces a comprehension check (p.2, L.25), but there is no uptake by the student (L.26). This is the first indication of upcoming trouble in segment 4. When the TA reaches a conclusion (p.2, LL.28-30), the student produces a generic NTRI ("Wha::t?" (p.2, L.32)) that signals trouble and requires clarification. The TA's response seems designed to resolve a potential trouble in both hearing and understanding, since he identifies the concept he had been calculating ("This is total inflation"), at the same time showing the student his notes and pointing at the numerical result (p.2, L.34). However, in the next turn, the student identifies her trouble source with a more specific

question (p.2, L.36), providing an opportunity for the TA to respond to her question precisely. After two false starts (p.2, L.37), the TA provides an example in response to the student's trouble. Throughout this example (p.2, L.37 to p.3, L.11), the student produces some timely continuers (p.2, LL.43 and 47), an understanding check (p.2, L.53), and information receipts (p.3, LL.4, 8, and 11), but she also fails to produce uptakes in two occasions (p.2, LL.45 and 50), while uttering a change of state token (p.3, L.2) that suggests previous trouble in understanding. At the end of the example (p.3, L.9), and, thus, of the response to the student's clarification request, the TA repeats the information that preceded the student's NTRI (p.2, L.30): "..is two hundred five.". This time, the student produces a minimum uptake (a nod, p.3, L.10) and only verbally acknowledges the TA's turn (p.3, LL.11) after he solicits further response by looking at her. The TA then continues the problem-solving process (see segment 5 below).

The instance of trouble in understanding identified in segment 4 is a content-related case. The student locates the trouble source in "those little parentheses" while pointing at the TA's notes, but she also exhibits signs of upcoming trouble in the preceding turns (p.2, L.26, described above), indicating possible trouble in understanding throughout the preceding explanation. The student continues to exhibit signs of upcoming trouble through part of the explanation, at the same time acknowledging the information provided by the TA. In order to find out whether trouble in understanding has been resolved, one needs to look further down in the sequence.

Segment 5, which partly overlaps with segment 4 to show continuity, contains more trouble in understanding that relates to the previous segment.

(Segment 5. Session 13, p.3)

```
    TA: Which in this case is two hundred five. right?
10->    (1.0)                          ((S nods. TA looks at her, then S answers))
    S:  Okay.
    TA: So:.one plus P: A, well in this case iss sorry. one
        hundred five. right?
--->    (1.3)                  ((No S reaction. TA turns notes over and points))
15      Is a different.
        (.5)
--->S:  O:::h okay.
```

In lines 12 and 13 above, the TA admits having made a calculation error, changing "two hundred five" (L.9) to "one hundred five". The student fails to respond to the comprehension check attached to that turn (L.14), but, after the TA's next turn (L.15), she offers a delayed change of state token (L.17). This indication of understanding casts the student's minimum uptake in line 10 and gaps in lines 14 and 16 as signs of trouble in understanding. The trouble source here may well be the TA's error and correction (LL.9, 12-13, and 15), and it appears to be resolved by line17.

Knowing that "two hundred five" is a calculation error adds a new interpretation to the trouble in segment 4, since the first time this figure is mentioned is on page 2, line 30 (the turn preceding the student's NTRI). The TA's mistake could now have also been a source of trouble in the understanding problem analyzed in segment 4.

In segment 6, the TA goes one step further in the problem-solving process, and the student shows more signs of trouble.

(Segment 6. Session 13, p.3)

```
--->S:  O:::h okay.
    TA: Okay? .hh so::: is going to be equal to:: (.3) o:ne
        plus (.) one point o fi:ve,* (.7) right?        ((*Stops writing and
20      (.)                                                /turns gaze to S))
    S:  Yea::h.                                                ((TA smiles))
    TA: Ye[ah yes or not.
--->S:    [u:::hh u:::::hh (.) wait a minute. ((S laughs, takes TA's notes))
        [Hhhhh
25  TA: [*This is the inflation.just the inflation. right?   ((*TA points at
    S:  Okay. [that's the total an and                          /notes))
    TA:       [(  )      total b[ut
    S:                          [An then *THiss in he:re i-   ((*S points at
        represents the total.                                   /notes))
30  TA: Ri:::ght?                                          ((TA nods widely))
        (.5)
        But the total *iss                                ((*TA begins writing))
    S:  Okay.=
    TA: =O::ne  is a what- is o:ne plus because
35      I have a o::ne plus half
    S:  *Okay.=                                  ((*TA stops writing, looks at S))
    TA: =So I have to put o:ne Plus the total inflation.
    S:  Ah okay.
    TA: Oka:y? o::::::r you have que-=
40->S:  =Yea::h, (.) yeah. I understand.=
```

The TA's explanation increment and comprehension check (LL.18-19) are followed by an agreement token by the student (L.21). However, the TA produces a second and more elaborate comprehension check (L.22) that questions the student's response and, by implication, her understanding.

The student's reply (hesitation plus "wait a minute.", followed by laughter while checking the TA's notes, LL.23-24) signals trouble in understanding, confirming the TA's implied doubt. Some clarification follows in which student and TA collaboratively revise the preceding problem-solving step (LL.25-40), at the end of which the student produces a change of state token (L.38). Here again, the TA insists on checking her understanding (L.39), but the student ratifies her understanding (L.40) and the explanation continues.

Trouble in understanding in segment 6 is somewhat brought to the foreground by the TA, who insists on checking the student's understanding in line 22--this is referred to as a non-routine comprehension check later on. The trouble source is not clearly specified by the student, who simply requests the TA to "wait a minute" (L.23). The collaborative review of previously introduced elements of the explanation by the TA and student in the next few turns (LL.25-40) places the trouble source probably in lines 18 and 19, but, given the student's problems in understanding identified in segments 6.14 and 6.15 above, the trouble may also be of a general type, having originated earlier in the explanation.

Before the end of this problem-solving sequence, there are two more instances where the student's understanding is questioned by the TA. The segments containing such instances are analyzed below.

(Segment 7. Session 13, p.4)

(1.0)

**R.13, p.4**

--->TA: [You und[erstand the: [you understand the idea? [o:r ((High pitch))

S: [Oh [okay [yeah. [yeah.

(.3)

5 Yeahhhehehehehehtch [.hhhh ((Laughs))

TA: [Eh ((Laughs softly))

--->S: I think I do. I mea:n, .hh the Only thing that's confusing me is

(1.3) ((Both look at someone coming in))

Is this *o::ne. ((*S points at notes))

10 (1.3)

TA: Ye[ah because (in general when) you- (.) when you ha:ve,

Segment 7 follows the explanation that began at the end of segment 6. A remarkable similarity exists between these two segments. In both segments, the TA produces a non-routine comprehension check, and, after some laughter, the student admits having some kind of trouble in understanding. In segment 7, the student locates this trouble in "this one" (L.9) while pointing at the TA's notes, and, after two false starts by the TA (LL.11 and 14), she overlaps the TA's turn to specify more clearly where the trouble lies (LL.15-17). Some clarification follows (LL.11-31), at the end of which comes the final understanding check and the end of the sequence. As in segment 6, the student's admittance that she has trouble understanding part of the explanation in segment 7 follows the TA's somewhat persistent comprehension checks. In addition, the trouble source is possibly both local and global since the student places it on a specific step of the explanation, but she has also been giving signs of trouble all along.

In segment 8, the TA questions the student's understanding once more. This is also the end of the problem-solving sequence.

(Segment 8. Session 13, p.4)

TA: Right?

30-> *(1.5) ((*TA stops writing, looks at S. S nods several times))

```
    S:  Okay.
    TA: Thiss (     )                                   ((TA points at notes))
    S:  Yeah, yeah.                                     ((S nods repeatedly))
    TA: Maybe the(r)e's a question in the final here.
35      so you you have any:: c [( ) comments o:::::r
    S:                          [*Hehehehe .hhhh    No      ((*S laughs))
--->    No I understand now.<[(I'm jus- gonna write down)   ((S writes))
    TA:                      [(Okay)
        (5.0)
40  S:  U:hm I have one more question and (       )     ((S looks at notes))
```

The TA's comprehension check that begins segment 8 (L.29) happens at the end of the clarification process just mentioned above (LL.11-31). The student acknowledges receipt (LL.30-31) and then agrees (L.33), in response to a turn by the TA that can only be half deciphered (L.32). The TA then makes a statement that may be interpreted either as showing concern or as putting pressure on the student ("maybe the(r)e's a question in the final here." (L.34)). The TA checks the student's understanding once more (L.35), eliciting, first, laughter from the student (L.36), that could be interpreted as a sign of trouble as in segments 6 and 7, and, then, an explicit claim of understanding (L.37). An acknowledgment receipt in overlap by the TA (L.38) and an outloud by the student (L.37) close the sequence.

The TA's reference to the upcoming test and his insistence in checking the student's understanding in segment 8 appear to indicate that he is not convinced the student has fully understood the explanation. Unlike in segments 6 and 7, in 8 the student claims understanding. There is no sure way of knowing analytically whether the student fully understood the overall explanation or not; however, we can at least

summarize the evidence that might have influenced the TA's lack of conviction.

First, reflecting on the manifestations of trouble in understanding contained in segments 6 (p.2, L.36: "why did you put out those little parentheses here.") and 7 (p.4, LL.7 and 9: "The Only thing that's confusing me is Is this o::ne."), the trouble source seems identifiable and concrete. However, it has also been argued that a more general kind of trouble may have affected the student's lack of understanding there, in particular, when the student's expression of trouble followed her own admittance of understanding and the TA's repeated comprehension check. In addition, in segment 4, the trouble source is not clearly specified (p.3, LL.14, 19, and 23). Finally, on two other occasions, the student produced a change of state token and a recipiency token, respectively, after two calculation errors by the TA (p.1, LL.43-50; and p.3, LL.9-13, respectively), two likely signs of general trouble (either the student was inattentive, or she was not following the explanation). Put together, these manifestations could well have influenced the TA's implicit impression throughout the sequence, as well as at the end of it, that the student was unclear about the explanation. On the other hand, if the student achieved clear understanding of the problem at the end of the presentation, TA and student probably miscommunicated at some level of interaction that escaped our analysis, since the TA ended the sequence with the impression that she did not.

**Content: Native TA case**

In session 35, TA and student are going over the student's responses to a past midterm. The student shows concern about getting extra credit in some questions but apparently not in the problem-solving sequence selected for analysis here. This sequence, which begins on page 2, line 5, and ends on page 7, line 8 (see Appendix 3 for transcription), is the fifth business item out of eight that take place in this session. Since the student's question to the TA is double-fold ("well what's the difference between these two. (.3) okay<wait. can you explain those questions. hhhhh .hhh" (p.2, LL.11-14)), this sequence contains two subsequences, one for each explanation to those two test questions: subsequence one (p.2, L.14 to p.5, L.17) and subsequence two (p.5, L.18 to p.7, L.8). Analyzing these two subsequences is of interest to this study because they contain trouble in understanding that appears to carry through both, as I shall try to illustrate below. The analysis will have three focal points that contain evidence of trouble in understanding. Starting from the end of the problem-solving sequence (where trouble in understanding is explicitly identified by the student) and working our way back, these points are: 1) a clarification question asked by the student (p.5, LL.41-43); 2) a TA's reference to the student's lack of understanding (p.4, L.53: "you don't look too convinced."); and 3) the student's inability to answer a probing question by the TA (p.3, L.12: "I don't know"). The analysis that follows attempts to demonstrate that these three occasions are related, i.e., that there is a similar trouble in understanding that connects them.

1) Focal point one (L.41 below) occurs a few turns after the beginning of the second subsequence (p.5, L.18).

(Segment 9. Session 35, p.5)

```
    TA: Okay.<So, (0.5) so you would expect to see dema:nd, (.)
        very elastic.
--->    (3.0)
40  TA: You'd you'd expect [that will (be) (very) (e:lastic) (then)
--->S:                     [*Wait I don't understa:nd     *((Distressed tone
--->S: Okay. Uh like mathematically I understand elasticity     /of voice))
        but what does it mean like (.) *.hhhhh hhhhhh             ((*Sighs))
```

In this segment, lack of student response (L.39) to the TA's concluding remark in lines 37 and 38 is treated as a sign of trouble by the TA, who begins a partial repetition of the previous turn in line 40. Overlapping the TA, the student then expresses trouble in understanding, identifying the concept of "elasticity" as the trouble source (LL.41-43). Since the TA has just described the "demand" as being "very elastic" (LL.37-38 and 40), it appears that this is an instance of local trouble in understanding. However, If the student does not understand what "elasticity" means, though she understands how to calculate it mathematically, her trouble in understanding most likely transcends the immediate context, for there are several references to "elastic", "inelastic" and "elasticity" in the preceding explanation (p.3, LL.24 and 33; p.4, LL.24, 28, and 42; and p.5, LL.6 and 27).

Let us first search for evidence of trouble in understanding that may relate to the "elasticity" problem as far back as the beginning of the second subsequence. This subsequence begins with the TA's response to the second half of the student's initial question: "And then the ten point

(answer was)..." (p.5, L18). The student then asks a clarification request designed for agreement ("didn't you...". p.5, L.23), followed by the TA's introduction of the distinction 'elastic-inelastic' (p.5, LL.26-27) and an example of 'elasticity' (p.5, L.29). It is immediately after the conclusion to the TA's example (p.5, LL.37-38, contained in segment 9) that the first indication of upcoming trouble occurs (L.39), following which the student expresses her difficulty in understanding the concept of 'elasticity' (p.5, LL.41-43, also in segment 9). Therefore, it is safe to assume, on the one hand, that the concept of 'elasticity' is relevant to understanding the answer to the second part of the question, and, on the other, that the student was unclear about this concept when the TA began that subsequence.

2) Focal point two is located at the end of the first subsequence. In it, the TA expresses his concern that the student might not have understood the explanation thus far (i.e., the solution to the first part of the student's question).

(Segment 10. Session 35, p.4)

```
    TA: So overall our total revenue (0.2) de:creases.
50      (1.0)                          ((TA stops writing, turns gaze to S))
    S:  Mkay.                            ((TA looks at S. S looks at notes))
        (3.0)
--->TA: You don't look convinced.
        (2.0)
55  S:  Okay. Uhh no: I got it.
        (3.0)
```

The student replies to the TA's concern in line 53 with reassurance that she has understood (L.55), but her response occurs after a two-second

gap, and it is prefaced by a token of recipiency, followed by hesitation ("Okay. Uhh..."). This reply does not reassure the TA, as evidenced by his unsolicited summary of the previous explanation in the turns that follow (p.5, LL.1-14). Let us now trace the interactional traits that may have led the TA to believe the student had not fully understood the explanation of the first part of the question.

There are at least three features in the student's behavior preceding line 53 (segment 10) that may signal upcoming trouble: student gaps, minimum or no uptakes, and lack of gaze. A co-occurrence of these three features appears in lines 50 and 51. After the TA's concluding statement ("So overall our total revenue (.2) de:creases." (L.49)), there is a two-second gap (L.50) that can be attributed to the student, since it happens at the end of the TA's turn, where a response by recipient is due immediately after the completion of the turn. In addition, the TA requests the student's gaze during the gap, but the student does not gaze back, a sign of disalignment with the TA (see Goodwin, 1980). Finally, when the delayed response occurs (L.51), it is a minimum uptake ("Mkay.") that indicates recipiency but not necessarily understanding. These features alone would suffice to account for the TA's comment ("You don"t look convinced" (p.4, L.53). However, in the explanation process that precedes segment 10 above, there are similar occurrences that could also account for the TA's comment. Here are two examples:

(Segment 11. Session 35, page 4)

```
30  TA: (1.5) the:n if we lower
        our price, (.) total revenue increases.
--->    (1.5)                          ((TA turns gaze to S, then to paper))
```

°Okay so, (.) (as) price decreases total revenue in*creases.°

Here, upon completion of the TA's turn (L.31), a response is due, but there is no student uptake. In addition, the student does not engage in eye contact with the TA, even when the TA solicits her gaze (L.32).

(Segment 12. Session 35, end of page 3 and beginning of page 4)

```
56  TA: Then we have a lower *price, and a who:le lot more quantity.  ((*S's
--->    (2.0)       /gaze alternates from TA to paper twice. Ends on paper))
-----------------------------
1   TA: Right?                                                  B.35, p.4
--->    (.)
        Which will mean our revenues go up.
--->    (1.5)
5   S:  *Right.                                                 ((*S nods))
```

In this example, the student fails to respond to the TA at the end of two consecutive turns: first, after a concluding remark (p.3, L.56) and, then, after a comprehension check (p.4, L.1). When she finally responds, after the next TA turn (p.4, L.3), her uptake follows a one-and-a-half-second gap. She also fails to maintain eye contact with the speaker from the end of the TA's first turn (p.3, L.56) on, although the speaker gazes at her throughout the segment. The signs of upcoming trouble illustrated in the examples above add a new dimension to the TA utterance: "You don't look convinced" (p.4, L.53), suggesting that the TA may be responding not only to the immediately preceding turn, but also to these other interactional clues the student provides throughout the preceding explanation.

Let us return now to the issue of 'elasticity' that was introduced above. The first time the TA makes an explicit reference to this concept

is on page 3, lines 23 and 24: "Okay.<what we're interested for this is the (owned) price elasticity.". Having established that the student remembers this concept "vaguely" (p.3, LL.28 and 29), the TA then proceeds to explain it in pages three and four, at the end of which explanation the TA states: "You don't look convinced" (p.4, L.53). Four more mentionings of "elasticity" (or a related term) are made in pages three and four (p.3, L.33; p.4, LL.24, 28, and 42). The last three mentionings occur in turns that require an immediate response by the student; however, after the first one (p.4, L.24), the student's continuer follows a one-second gap. After the second one (p.4, LL.27-29), there is no student uptake (although there is no gap either), and, after the third one (p.4, LL.42-43), there is a one-second gap and no student uptake. Based on this analysis and on the fact that the student explicitly admits not understanding 'elasticity' further on in the interaction, it can be stated that the TA's stated impression that the student is not clear (p.4, L.53) is well grounded. Furthermore, it can be hypothesized that lack of understanding of the concept of 'elasticity' is a major contributing factor to the general trouble in understanding the student is exhibiting throughout the problem-solving subsequence.

3) Focal point three, introduced above and contained in segment 13, follows the student's question at the beginning of the sequence (p.2, LL.7-14) and is a continuation of the TA's response to part one of that question:

Segment 13. Session 35, end of page 2 and beginning of page 3

TA: People bu:y more.<But does that mean revenues go up.

50 S: Not *necessarily. ((*Voice shakes))

(2.0)

35

```
    TA: *Because,                                          ((*TA turns gaze to S))
--->    (2.0)
-------------------------
1   S:  W'll but you: could buy other things                              B.35, p.3
        *right?                                            ((*S turns gaze to TA))
        (1.0)
--->TA: Yeah. *But       ((*TA points to paper; S and TA turn gaze to paper))
5       what will (0.5) what will determine whether or not
        revenues *go up.<what do you have to know:     ((*TA turns gaze to S))
        (0.5)
        About the dema:nd
        (0.2)
10  TA: To be able to tell whether revenues go up or down.
    S:  Whether there is a: no:rma:l o:r
--->    (1.0) *I don't know.                                   ((*S shakes head))
        (.)
    TA: Normal or inferior is related to: (.) what.
15->    (2.0)
        Income.
--->    (1.0)
    S:  Okay,
    TA: Right?
20  S:  Right<okay.
    TA: Okay.
    S:  *.hhhhhhh hhhhehh      ((*Deep sigh, head shake, runs fingers through
--->TA: Okay.<what we're interested for this is the (owned) price     /hair))
--->    elasticity.
25      (0.5)
    S:  Okay.
```

This segment begins with a probing question by the TA (p.2, L.49). The student's reply (p.2, L.50) is correct but incomplete, as the TA makes clear, first, by waiting for the student to continue her answer (p.2, L.51),

and, then, by requesting further completion while inviting collaboration through talk and gaze (p.2, L.52). The student's response (p.3, LL.1-2) is still not satisfactory, since the TA continues probing for an answer (p.3, LL.4-10). The student attempts to answer the TA's rephrased question, but she leaves her sentence unfinished and admits not knowing the reply (p.3, LL.11-12). Through another probing question (p.3, L.14), the TA invites the student to clarify her previously unfinished sentence, but, after a two-second student gap, the TA responds to his own question (p.2, L.16). Finally, after a comprehension check and a series of continuers (p.3, LL.18-22), the TA introduces the basic concept needed to continue the problem-solving process: "Okay.<what we're interested for this is the (owned) price elasticity." (p.3, LL.23-24).

The analysis of segment 13 illustrates how probing questions function as an interactive tool which, among other things, can locate trouble in understanding. This analysis also attempts to establish a connection between the concept of 'elasticity' and the source of the student's trouble in understanding. The TA's focus on "(owned) price elasticity" as the concept of interest after the student's inability to reply to his probing questions marks this connection. Furthermore, in the turns following segment 13, this relationship is ratified by the student's admittance that she remembers that concept "vaguely" (p.3, L.29)--i.e., not clearly--as well as by the ensuing explanation of the concept by the TA (p.3, L.31 to p.4, L.51).

The three focal points selected at the beginning of this section exhibit trouble in understanding that can be accounted for locally, i.e.,

within the immediately preceding turns, as illustrated by the analyses above. However, those analyses also attempt to unearth evidence that a general trouble in understanding runs through both subsequences of the problem-solving sequence and that such trouble is related to the student's lack of understanding of the concept of 'elasticity'.

The remainder of this section addresses the part of the problem-solving sequence that follows the student's clarification request on page 5, lines 41 to 43: "[Wait I don't understand okay. Uh like mathematically I understand elasticity but what does it mean like (.) .hhhh hhhhh" (provided in segment 9 above). In summarized form, the explanation/clarification process that follows (p.5, L.44 to p.6, L.46) is highly interactive, with the student posing another clarification request (p.5, LL.47-50) and two understanding checks (p.6, LL.18-19 and 44-45), in addition to co-explaining with the TA (p.6, L.23, 25, and 32-33). The TA, in turn, asks a probing question (p.6, LL.9-12) and also co-explains with the student (p.6, LL.24, 26, and 34). In order to assess the outcome of this clarification process, I shall now analyze part of its ending segment.

(Segment 14. Session 35, p.6)

TA: If that's true then: (1.0) °you say demand is inelastic.
S: *So, because this is<wait if it's ((*S leans forward))
*elastic though it's, (.) okay ((*TA turns gaze to notes))
alright so I get it.
(1.0)
S: *°(Can I keep this piece of paper)° ((*S puts hand on TA's paper))
TA: Yeah. ((Nods twice))
*(0.5) ((*S starts ripping off page of TA's notepad))

TA: So *elastic we think of things ((*TA turns gaze to S))
that have a lo:t of substitutes.

This segment begins with a concluding remark by the TA (L.43) at the end of the explanation process summarized above. The student claims understanding of the explanation, but her turn also contains two incomplete understanding checks that may indicate trouble (LL.44-46). In addition, she requests to keep the notes written by the TA during the presentation (L.48). By summarizing the explanation in the turns that follow (p.6, L.51 to p.7, L.7), the TA seems to interpret the student's preceding turns as needing further explaining. In conclusion, it appears that, although the student claims understanding, implying that her trouble in understanding is resolved, the TA is not fully convinced, as evidenced by his adding a post-expansion in which he summarizes the explanation.

In relation to the goals of the participants in the consultation, although this problem-solving sequence is part of a post-test review session, there is no evidence that the student is claiming more credit for her answers. There are indications, however, that she is interested in understanding the concepts involved in answering the test question she refers to in her opening request (p.2, LL.7-14). Some examples of such concern are her explicit references to not understanding (p.2, L.7, and p.5, L.41), followed by clarification requests, as well as her references to understanding (p.4, LL.41 and 55, and p.6, L.46).

## Findings and conclusions

This paper has presented an analytical exploration of the concept of trouble in understanding in problem-solving sequences in the office hour consultation. A selection of instances of language- and content-related trouble in understanding have been described, first, to demonstrate that this phenomenon can be analyzed interactionally, secondly, to explore its structure (trouble source, development, and outcome), and, thirdly, to explore its function or how it affects the immediate as well as the larger context of the problem-solving process.

The analyses have shown that student trouble in understanding can be traced analytically through the participants' behavior. Sometimes the student makes explicit references to experiencing trouble (for example, when requesting clarification or stating that she has not understood), but in other cases, the student's trouble is manifested through uptake delays or lack of uptake altogether, wrong inferences, and other audible and visible behavior. In such cases, the TA may opt to address the student's trouble by checking her comprehension or by repeating part or all of the preceding explanation. However, the TA may also opt not to address the student's trouble until she makes an explicit reference to it. Occasionally, it is the TA who elicits the student's trouble in understanding through interactive teaching strategies such as, for example, probing questions, induced co-explanation, or non-routine comprehension checks.

In relation to the trouble source, we have identified cases where either language, content or both appear to be at the root of trouble in understanding. Occasionally, however, the participants do not provide enough information for the researcher to be able to identify the trouble

source. That an interactional phenomenon (here trouble in understanding) must be displayed in order for the interlocutor and the researcher to recognize it is a limitation that has also been acknowledged by Pearson and Lee (1992) in their study on direction giving.

With regard to the contextualized relevance of every instance of trouble in understanding (i.e., their effect on the overall problem-solving sequence), it seems fitting to introduce here a distinction, proposed by Selting (1988), between local and global problems in conversation. In the former, "recipient signals a problem with respect to prior speaker's last utterance or last turn" (p.295), whereas, in the latter, the problem relates to a general conflict. In Selting's terms, then, the language-related instances analyzed would be considered local problems that affect the immediate context, momentarily diverting the participants' attention away from the problem being solved in order to straighten out the communication problem. Content-related trouble, on the other hand, tends to be global, affecting a larger context--sometimes a whole problem-solving sequence, as has been illustrated above. Content-related trouble is also an integral part of the problem-solving process, rather than a momentary diversion, for the office hour is a teaching context where the student is primarily seeking content clarification. A critical remark to Selting's distinction, however, is that in the content-related instances analyzed, trouble in understanding manifests itself both locally and globally, being addressed by the participants at both the local level (here, the immediate context), and the global level (here, the larger context of the problem-solving sequence).

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One last distinction between language- and content-related trouble in understanding is in relation to outcome (i.e., whether or not the instance is successfully resolved). In the language-related cases, repetition and/or brief elaboration tend to solve the problem, whereas, in content-related cases, longer and more elaborate explanations are needed, while success in solving the problem in understanding is not always achieved.

When considering the overall impact of language-related trouble on TA-student interaction during office hours, it is worth re-stating that only thirteen such cases were identified in almost fifteen hours of interaction (twelve in about ten and a half hours of NNSTA-student interaction and one in about four and a half hours of NSTA-student interaction). This fact, added to how quickly and efficiently those cases were resolved, as shown in the examples above, points at the relatively small impact of this fenomenon on understanding as compared to content-related trouble. If we now remind ourselves that three of the TAs were nonnative-English speakers with an intermediate level of spoken English, one must conclude that the foreign accent and limited oral language skills of those NNSTAs seemed to have a mild analitically identifiable effect on understanding. (In a questionnaire the students filled out at the end of each session, they did not reflect any dissatisfaction with the NNSTAs' accent or language skills either.) We could go one step further to say that in order for language to seriously interfere with intelligibility in NNSTA-student interactions, the language level of the NNSTAs would probably have to be lower than that of the NNSTAs in this study--although this is likely to

vary depending on the TAs' native language (see Gallego, 1990, for further discussion).

When comparing the one native and the three nonnative TA cases presented in relation to language-related trouble, there are differences in relation to the trouble source--as is to be expected, nonnative pronunciation was only a NNSTA feature. In terms of structure, however, the NSTA case followed the same pattern as two of the NNSTAs' examples: An NTRI following the trouble source, ensued by repetition and clarification which restore understanding. Comparing the content-related cases of native and nonnative TAs is a rather complex task, first, because, what appears to be purely a content problem may have been made worse by nonnative use of language. Unfortunately, that information, which may not be reached analytically, can only be obtained through introspection. And second, because a comparison between two different processes of explanation of a concept would necessarily have to include linguistic, cognitive and pedagogical factors, a project that lies beyond the scope of this paper and merits a study of its own[4]. Rather than pointing out the differences, it is remarkable to notice that both TAs use non-routine comprehension checks to gauge student understanding. In addition, they provide evidence of not being convinced the student had fully understood their explanation at the end of the problem-solving sequence.

As a case study, this research aimed at raising questions rather than reaching definite and generalizable conclusions. In order to strengthen

[4]Such study has already been carried out in part (Gallego, 1992) and is now being revised for publication.

the findings described in this section, more similar studies are needed involving TAs coming from different linguistic backgrounds and teaching other disciplines.

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## APPENDIX 1

Transcription notation

| MARKING | MEANING/EXAMPLE |
|---|---|
| (.5) | -Unfilled pause in tenths of seconds. A micropause representing less than .2 seconds is marked (.) |
| : | -Elongation of vowel sound. Eg. u::h |
| lll, nnn, etc. | -Elongation of consonant sound. Eg. tennn. |
| h h | -Hearable outbreath. Eg. hh well you see:: |
| .h h | -Hearable inbreath. Eg. .hh do you have a minute. |
| Underlining | -Upward-downward inflection within a word; abnormal stress. Eg. Tomorrow (the larger the underlining, the greater the inflection/stress). |
| Capital letters | -Loudness (except at the beginning of a turn). Eg. I don't KNow (the more letters are capitalized, the louder the word). |
| ° | -Quiet talk. Eg. °Okay. |
| ? | -Rising intonation. Eg. Today? |
| . | -Falling intonation. Eg. Now. |
| , | -Continuing intonation (fall-rise, but lower than ?). Eg. Then, |
| ' | -Glottalization/ellipsis of a vowel sound. Egs. 1) It 'is; 2) B't |
| - | -Omission of a consonant sound. Eg. late- |
| [ | -Overlapping. Eg. A But you [said<br>B. [I I know. |
| = | -Latching by another speaker. Eg. A: So how are you=<br>B: =Fi:ne. fi:ne. |
| < | -Rush through by same speaker. Eg. Take it<if you like |
| > | -Word/utterance said rushedly. Eg. Da:ve.>oh my go:d< |
| ( ) | -Word/utterance not understood by transcriber. Eg. In the ( ) |
| (word) | -Questionable transcription of speaker's word/utterance. Eg. The (derivative) is... |
| (( )) | -Commentary, gloss, body movement, gesture. Eg. ((Speaker nods)). |
| * | -Marks the exact point in the utterance where a movement, gesture, noise, etc. occurs. Eg. I *don't understand this. ((*points at notes)). |
| ----> | - Feature of interest to the analysis. |

# APPENDIX 2

**Transcription-Roberto. Session #13** 

((TA looks at new S--off screen--after previous S has left desk)) **1:01:35**

```
0       (1.5)
    TA: You're waiting for me?
    S:  Yeah.                                                    ((Off screen))
    TA: .hh                                                   ((Laughs softly))
        (13.0)     ((TA waiting for S to come to desk. S appears on screen))
5   TA: Is your pen?        ((To previous S--off screen--showing her a pen))
        (1.5)
    TA: *XXX?                                              ((Previous *S's name))
    S12:No.
        (.5)
10  TA: (                 )
        (.5)
    S:  Hi. I'm (*        )                        ((*S sits down. Chair noise))
        (.5)                                    ((TA nods shortly and smiles))
        Uhm what I'm (                    ) stuff on the past
15      test that I got  wrong and I never figured out how to do:.
    TA: Uhu?
    S:  *Quihcklyhh. (.) uhm (.2) on this question uhm     ((*Soft laughter))
    TA: Wait wa wait.
        (.7)
20      I hhave I hhave the (.) I hhave the:: (3.0) the key of
        (            )
        (2.5)
        °This one.                                      ((TA looking for notes))
        (2.0)
25      Okay the second one (I think) (.) I remember the second one.
        (.5)
        Okay.
    S:  Okay I go:: I go:t thisss when I went back and re-did it.
        I go:t the: the CPI:: [I mean the price index.
30  TA:                       [(      )          ((points at notes and begins
    S:  See I got the price index here wro:ng.           /to say something))
    TA: Uh[um?
    S:     [But now I know it's two o five and I know how to
        divide but  .hh  I can't find the total rate of
35      inflation or the average annual  rate of inflation.
    TA: (Well that) (.2) remember that the: total- rate of
        inflation's  going to be the difference between the::
        (.2) index of yea::::::r (.3) of the basic year, right?
        (.) with respect to::: ninetee:::::nnn  nineteen ninety. right?
40      (.)
    S:  Mhum?                                  ((Lacks conviction. No nodding))
        (.)
    TA: So it's going to be hU:ndred,
        (1.0)
45      [Hundred which is the:
    S:  [(            )
        (.)
        O:h. ok[ay
```

TA: [(Nn) in this case no..h in this case Two Hun[dred Five
S: [( )

TA: Minu[s hundred, which is the index for the basic year, **page 2**
S: [Minus ( )
(1.7)
Two hundred 'n five minus a hundred. ((S is writing))
(.2)
TA: O::r a hundred multiplied by a [hundred.
S: [(Time ) okay.
TA: So [is one hundred five.
S: [I never had that do:wn. (.5) I never knew that.
uhm an' then the' (.) [the uh
TA: [(Wait something) uhn no no.
(1.0)
S: See thissss
TA: You have something (that's really not)
*hehere but u:h ((*Laughs and shakes head))
S: See 'cause that 'cause I fo:und the price
index to be at one sixty-five [instead of
TA: [Ye yeah.
S: Two o five.
TA: ntch .hhh and the average inflation the average annual rate
of inflation isss (.2)*.hhhh uh (.) ((*Reaches out for pen))
you remember iss a (.7)
(* pen) ((*TA's pen doesn't work. S gives him one))
Is o:ne pluss (.2) the average is going to be-
equal to: (.) what the number of year. right?
(1.0)
one ove:r (.3) N. N is the *number of ( ). right? ((*TA taps
So we have here [that this multiplication /with pen. S nods))
S: [( )
TA: Is iss u::::h two hundred five. right? ((TA stops writing,
(1.0) /looks at S))
S: Wha::t?
(1.0)
TA: This is the total inflation. ((Shows notes to S and points))
(.7)
S: Okay but why did you put out those little parentheses here.
TA: .Hh because if you want if you ha:ve (.) for example we have
he::re o::ne nineteenn seventy-five, ninteen seventy-six
(.5)
S2: [( ) ((S2--off screen--to TA))
TA: [Ni:netee:nnnnn eighty-ni- *yeah. thank you.(.) ((*To S2))
and nineteen (.3) ninety, (.3) okay? ((Writing all along))
S: Uhu.
TA: And I have the inflation from here to he:re, (.5) well
uh this with respect to thiss right? (.) ((No response by S))
this the the the:: ( ) years from respect to thi:s
S: Okay:,
(.)
TA: Oka:y? (.) so I have a (annual) inflation with respect
to last year (.5) right? .hh so:, (.3) to calculate the
total inflation y'have to multiply thiss.

(.)
S: Just the[: the difference inn [uhm
TA: [( ) [Yeah one plus B (.) of a:::::

[seventy-fi::ve, .h [one plus (.) u:::::hm ( ) **page 3**
S: [One ( ) [(o:h.)
TA: Seventy:::::::::-seven,and so on.
S: Okay.
TA: Okay? .hhh so this is the SA::me as calculate the the inflation rate of ni::nety-ninety with respect to ninety: sseventy-five.
S: O:key.
TA: Which in this case is two hundred five. right?
(1.0) ((S nods. TA looks at her, then S answers))
S: Okay.
TA: So:.one plus P: A, well in this case iss sorry. one hundred five. right?
(1.3) ((No S reaction. TA turns over notes and points))
Is a different.
(.5)
S: O:::h okay.
TA: Okay? .hh so::: is going to be equal to:: (.3) one plus (.) one point o fi:ve, (.7) right?
(.)
S: Yea::h. ((S, no gestures or nodding. TA smiles))
TA: Ye[ah yes or not.
S: [u:::hh u::::::hh (.) wait a minute. ((Takes TA's notes))
[Hhhhh
TA: [This is the inflation.just the inflation. right?
S: Okay. [that's the total an and
TA: [( ) total b[ut
S: [An then THiss in he:re i-represents the total.
TA: Ri:::ght? ((Nodding widely))
(.5)
But the total iss
S: Okay.=
TA: =O::ne is a what- is O:ne plus because I have a o::ne plus half
(?)
S: Okay.=
TA: =So I have to put o:ne Plus the total inflation.
S: Ah okay.
TA: Oka:y? o::::::r you have que-=
S: =Yea::h, (.) yeah. I understand.=
TA: =So::, o::ne ove::r (.) the number of of yearss. which in this case is [fifteen right?
S: [Fifteen.
(.5)
Okay.
(.)
TA: So if you solve for this is o:ne, is is average inflation, (.) one pluss (.) one point o fi::ve,

(.) one over fifteen minus one.
(.3) ((TA stops writing, leans back, looks at S. S nods))
Ann in this case isss
(1.2)
Well- I don't have the final result. hmhm ((Laughs softly))



(1.0)
[You und[erstand the: [you understand the idea? [o:r ((Pitch!))
S: [Oh [okay [yeah. [yeah.
(.3)
Yeahhhehehehehehtch [.hhhh ((Laughs. TA not sure S understands))
TA: [Eh ((Laughs softly))
S: I think I do. I mea:n, .hh the Only thing that's confusing me is
(1.3) ((Both distracted by someone coming in))
Is this o::ne.
(1.3)
TA: Ye[ah because ( ) you- (.) when you ha:ve,
S: [( )
(.5)
TA: Let's calculate<>for exam[ple Let's Assume that<
S: [See because Down He:re uh
the average inflation ( ) I Could Do it. with thi:s.
bu[t when [( ) I couldn't do it.
TA: [Yea:h >yeah yeah< [you have o:ne plus point fi:ve.
so you're going to get o:ne pluss P: total.
S: O:keyh.
TA: Right?
S: Okay.
TA: So that's the idea-<if you have one he:re, you're going
to get o:ne plus the total.(.3) * inflation. ((S nods softly))
(.)
So you have to put O::ne, Pluss one
[hun one [hundred five per cent.
S: [uhn [uhnn five okay.
TA: Right?
(1.5) ((TA looking at S. S finally nods and responds))
S: Okay.
TA: Thiss (notes?)
S: Yeah, yeah. ((S nods repeatedly))
TA: Maybe the(r)e's a question in the final here.
so you you have any:: c [( ) comments o:::::r
S: [*Hehehehe .hhhh No ((*Laughs))
I understand now.<[I understand about that. u:::::h ((S writes))
TA: [(Okay)
(5.0)
S: U:hm I have one more question and ( ) ((S looks at notes))

((End of session 36 (lines 1 and 2) in which the student in session 36 (S36), off screen, interrupted session 35 to ask the TA a logistics question. Session 35 continues (line 3) with the student (S) initiating a new business item in the consultation))

S36: (That's) okay. *thanks ((*S looks at S36))
TA: *Uhum? ((*Nods))
S: *U:::h (1.0) okey. ((*S and TA look at S's notes))
wait. .hh I just <u>me</u>ssed up this question big time
but I listened to you explain it to <u>h</u>im so I think I,
(*4.0) ((*S still looking at notes))
Okay wait. If you ha:ve, (1.0) okay if you-
if you <u>get</u> rid of the (ta:b), (.) the:n
(3.0) your supply will go: *<u>d</u>own in the US. ((*S turns gaze to TA))
(.)
Wait. *(.) ((*S throws head up and away from TA))
TA: >Yeah I mean< *(.) ((*S turns gaze to paper; TA points
this half of this is right, /with right hand to her paper))
(.)
S: Right.
(.)
TA: *This half was wrong. ((*TA points to a different point
(.) /in her paper))
S: Okay.
TA: So what happens is .hhh you expect to see the supply curve
shift this way in the US.
(0.5)
TA: Be[cause (although you're gonna) [<u>im</u>port more goods
S: [Right [( ) ((S nods & turns gaze to TA))
TA: *from Mexico:, (.) essentially because ((*TA turns gaze to S))
the input cost, (.) of doing that
is declined,<you no longer have to pay this tarif when you
import [.hhh
S: [Okay.
TA: Okay? .h But, *(0.5) <u>th</u>is part said ((*TA points at S's notes))
(.) m- more goods from the US are
going to go into [Mexico<we looking, [we looking at the same
S: [(that's-) [Okay.
TA: good,
S: Mhm
(0.2)
Right.
(.)
TA: [( )
S: [So goods are gonna go::, (.)
TA: So the <u>pri</u>ce in M:exico is cheaper than it is in the US.
S: So they goona ship them he:re.
TA: Right.
S: So the supply is gonna, *(0.5) shift <u>th</u>is [way. ((*TA nods))
TA: [Right.
(.)

TA: Exactly.
S: Okay.

TA: *So that, (.) °°(kind of)°° (.) ((*TA turns gaze down)) **B.35, p.2**
°the half that was wrong on that.°
(1.0)
S: °Okay.°
(*8.0) ((*S and TA look at S's paper; S pages through her notes))
TA: °Looks like (I was meaner on this one).° ((TA smiles))
S: °°Right<(let's go back<I just told you)° I didn't understand
the question.
*(.) ((*TA pulls S's paper slightly towards himself))
*.hhh Cuz it has to do with, (0.2) ((*S rests head in her hand))
uh:m (2.0) *well what's ((*S takes hand down and leaves
the difference between these two. /head tilted))
(0.3)
Okay<wait. Can you explain those questions. *hhhh .hhh ((*Laughs))
TA: Okay. hhh uhm: (3.0) the main *part, (.) ((*TA leans back))
the main >thing you're looking for in the question is<
*(.) **suppose you sell a good (1.0) you have ((*TA turns gaze to S
a deficit. So what d'you wanna do to reduce /**S turns gaze to TA))
your deficit.
(0.8)
You wanna increase revenues.
S: *Right. ((*S nods))
TA: °Right.°<You wanna have more dollars.
S: Okay.
TA: °Okay.° .hhh *Well this question ((*TA turns gaze down to paper))
says given that problem, (.) both these two
groups decided to *lower prices. ((*TA turns gaze to S))
(3.0)
S: Oka[y.
TA: [Alright?
(.)
TA: So what they're doing *is .hh lowering ((*S turns gaze to TA))
prices, (.) an' assuming that will lead
to an [increase in revenues.
S: [( )
S: Right.
TA: [(°Well-°)
S: [*Cuz they think people will buy more. ((*S leans back))
(*2.0) ((*TA writes on notepad))
TA: *Okay but what ((*S moves torso forward and gaze to notepad))
determines- that's that's definitely
true we have [this (main) curve,
S: [Right,
S: Okay.
TA: And so<those are prices here initially, (.) and then prices
here, (2.0) they lower the price.
(.)
S: Oka:y.
TA: People bu:y more.<But does that mean revenues go up.
S: Not *necessarily. ((*Voice shakes))
(2.0)

TA: *Because, ((*TA turns gaze to S))
(2.0)

**B.35, p.3**

S: W'll but you: could buy other things
*right? ((*S turns gaze to TA))
(1.0)
TA: Yeah. *But ((*TA points to paper; S and TA turn gaze to paper))
what will (0.5) what will determine whether or not
revenues *go up.<what do you have to know: ((*TA turns gaze to S))
(0.5)
About the dema:nd
(0.2)
TA: To be able to tell whether revenues go up or down.
S: Whether there is a: no:rma:l o:r
(1.0) *I don't know. ((*S shakes head))
(.)
TA: Normal or inferior is related to: (.) what.
(2.0)
Income.
(1.0)
S: Okay,
TA: Right?
S: Right<okay.
TA: Okay.
S: *.hhhhhhh hhhhehh ((*Deep sigh, head shake, runs fingers through
TA: Okay.<what we're interested for this is the (owned) price /hair))
elasticity.
(0.5)
S: Okay.
(0.2)
TA: You remember that vaguely?
S: Va[guely yes.
TA: [It's
TA: (*John) went over this when I was ((*TA turns gaze to paper))
*gone. .hhh uhm (3.0) ((*S turns gaze to TA, combs hair,
what the (owned) price elasticity tells us if, /and looks down))
(0.5) we get this *percent cha:nge, (0.2) ((*TA writes))
in quantity (demanded) over percent cha:nge in the p- (.)
S: Price
TA: hhhh In [the price *of the goods. ((*TA turns gaze to S))
S: [(Times,)
S: Uhu,
TA: Okay.<.hh *So what we're ((*TA turns gaze to paper; writes))
looking at is if: (.) is if
price goes down by some amount, (1.0)* ((*TA gazes at student))
S: Uh hm,
(0.5)
TA: *°Okay.°**if the percent change ((*TA turns gaze to paper. **S gazes
in quantity, (0.2) we know from /at TA briefly, then at paper))
the demand curve this is gonna be positive.
(1.0)
S: Okay,
(.)* ((*TA gazes at S briefly, then at paper))

TA: °Okay°=
S: =°Right.°=
TA: =If the percent change in *quantity, ((*S turns gaze to TA))
*(2.0) is really big, (1.0) ((*TA turns gaze to S))
S: Uh hm,
TA: Then we have a lower *price, and a who:le lot more quantity. ((*S's
(2.0) /gaze alternates from TA to paper twice. Ends on paper))
TA: Right?
(.)
Which will mean our revenues go up.
(1.5)
S: *Right. ((*S nods))
(1.0)
TA: I[f:,
S: [°°(Okay)°° ((*S nods))
TA: the percent change in quantity is really* sma:ll, (1.5) ((*S looks
the price goes down, (0.2) and you sell, (.) one more unit. /at TA))
(.)
S: Uh huh. ((Small nod))
TA: Then your revenues are gonna fall*. ((*S turns gaze to paper))
(1.5)
S: Okay, yeah.
TA: Ye- because you lo:se that difference in the price on all the
units you sold originally, and you only sell one mo:re.
S: *Uh huh, ((*S nods, tuns gaze to paper))
TA: That means your revenues are gonna fall.
S: Okay °yeah.°
TA: Okay.<So*, (.) what that re- the result ((*TA writes, looks down))
of that is .hh is that this number is greater than one,
(1.0)
We call that ela:stic.
(1.0)
S: Uh hm,
TA: Because when price goes down we have a big
*change in quantity °so it's an *ela:stic ((*TA turns gaze to S))
°°*change.°° .hhh uhm, ((*Big hand gestures. TA's and S's gazes meet
(1.5) the:n if we lower /briefly, then they both look at paper))
our price, (.) total revenue increases.
(1.5) ((TA turns gaze to S, then to paper))
°Okay so, (.) (as) price decreases total revenue in*creases.° ((*S
(1.0) ((TA turns gaze to S)) /nods))
Our price goes *down a little bit, (.) ((*S turns gaze to TA))
we sell a whole lot more, ((Large TA hand gestures through turn))
(.) [our total revenue goes up.
S: [°°hm°°
S: O:kay.
(.)
Yeah. I understand that. *hhhh ((*Soft laughter))
TA: If it's less than one, (1.0) it's inela:stic, (1.0) and just
the opposite.
(1.0)
As our price goes down, (.)
S: Hm [hm,
TA: [We *sell more of it **not very much. ((*TA looks at S. **S looks

B.35, p.4

(1.0)* /at TA. *Both look at paper))
TA: So overall our total revenue (0.2) de:creases.
(1.0) ((TA stops writing, turns gaze to S))
S: Mkay. ((TA looks at S. S looks at notes))
(3.0)
TA: You don't look convinced.
(2.0)
S: Okay. Uhh no: I got it.
(3.0)

TA: Okay so this- this was the answer (.) **B.35, p.5**
we were looking for in that question.
(2.0)
The idea that, (1.2) *this could be c- ((*TA points at S's notes))
this could be a correct decision for both groups if they were
both assuming, (.) demand for their product was very e:lastic.
(2.0)
S: Right.
(0.2)
S: Ok[ay
TA: [°Okay?°
(.)
TA: And if that's true then when they lower price they would expect
to see total *revenue go up. ((*S leans back and forth on chair))
(1.0)
S: Alright
(.)
TA: And then the ten point (answer was) to say *something ((*TA gestures
about (.) whether or not that was /over S's notes))
a realistic assumption °°for both of them.°°
S: Well when we talked about it in class
TA: Uh hm,
S: Didn't you talk about whether or not there were other
substitutes for it
(2.0)
TA: That will dete:rmine whether or not *(2.0) ((*S turns gaze to TA))
a good is elastic or *inelastic. ((*S turns gaze to paper))
S: Okay.
TA: °Okay?° .hh If, (1.0)* for example ((*TA leans back, S leans right;
with the opera in New York where there is also /their gazes meet))
all of Broa:dwa:y:, there is mo:vie:s, there is
tons of (them) *.hh[hh ((*S leans right, away from TA. Her face
S: [There is lots of things /is off screen))
TA: The[re's lots of other forms of entertainment.
S: [Other things
S: Right.
TA: Okay.<So, (0.5) so you would expect to see dema:nd, (.)
very elastic.
(3.0)
TA: You'd you'd expect [that will (be) (very) (e:lastic) (then)
S: [*Wait I don't understa:nd *((Distressed tone
S: Okay. Uh like mathematically I understand elasticity /of voice))
but what does it mean like (.) *.hhhhh hhhhhh *((Sighs))
TA: Uhm intuitively I think it's *easier ((*S's face is back on screen;

to think of it in terms of a price increase. /S is looking at TA))
*(2.0) ((*S nods slightly))
S: So oka[y sa:y:, (.) alright so why:: okay if you add ((S and TA
TA: [(when) /maintain eye contact most of the time for the
S: add a lot of other substitutes than why: is it /next few turns))
(.) totally elastic.
TA: It's gonna be very elastic because<.hh suppose the price of: (.)
>you know< you're just, (.) you're just indifferent between going to
the opera .hh and spending your money on some play on Broadway.

S: Ri[ght. ((Small nod)) **B.35, p.6**
TA: [Given the current prices.
(.)
S: *Ok[ay. ((*Small nod))
TA: [°Okay.° But there's a:ll these substitutes there's
a hundreds of plays you can go to any of these any night.
(.)
S: [°°Uh huh°°
TA: [Instead of the o:pera.
(.)
TA: What are you gonna do if the price of the opera goes up a little
bit.
(.)
S: Go somewhere else.
TA: Okay. That means your demand's elastic. Your price goes up,
(3.0) the quantity demanded falls a whole lot because everybody
goes and does something else.
S: So does that mean it respo:nds (1.0) uhm (0.5)
to a little change *in price? *((Voice shakes))
(.)
S: O:r not [( )
TA: [That means you have <u>big</u> response and demand
S: To a litt[le
TA: [For a little change in pri[ce
S: [That's w- that's elastic.
TA: That's elastic.
(2.0)
S: Okay.=
TA: =(At) the other end of the spectrum is things like for
cigarette smokers.
(1.0)
S: No matter wha:t the change in price, they're not they'll
sti[ll buy ( )
TA: [They'll still (right).<So if they get a little change
in price, (2.0) they may smoke one cigarette less a month.
(.)
TA: Or something.
S: Okay.
TA: Okay so it has a ve:ry very small impact
(.) on the quantity demanded.
(.) ((S turns gaze to notes))
S: °hh okay hh°
TA: If that's true then: (1.0) °you say demand is <u>in</u>elastic.

S: *So, because this is<wait if it's ((*S leans forward))
*elastic though it's, (.) okay ((*TA turns gaze to notes))
alright so I get it.
(1.0)
S: *°(Can I keep this piece of paper)° ((*S puts hand on TA's paper))
TA: Yeah. ((Nods twice))
*(0.5) ((*S starts ripping off page of TA's notepad))
TA: So *elastic we think of things ((*TA turns gaze to S))
that have a lo:t of substitutes.
(.)
TA: You can do a lot of other things instead, (.) so if the price
of the current thing goes up a little bit, (.)

S: Uh huh,
TA: You consume something else *instead. ((*S begins writing))
(2.0)
Whereas for inelastic like for cigarette smokers there aren't
really any substitutes for cig- or many substitutes for cigarettes.
(.)
So if they price goes up, (.) they still buy cigarettes.
(32.0) ((During this long silence S writes up her notes))
S: *Do you think this midterm will be ((*S closes notepad))
as hard as this *was? ((*S looks at TA, smiles))

**B.35, p.7**